THE PHILOSOPHICAL MAGAZINE

EDITOR
W. H. TAYLOR

CONSULTANT EDITOR
PROFESSOR SIR NEVILL MOTT

E.P.S. EDITORIAL COMMITTEE
PROFESSOR JACQUES FRIEDEL
PROFESSOR DR. ALFRED SEEGER
PROFESSOR UGO VALDRÈ

CONSULTANT
SIR GEORGE THOMSON

VOL. XXX.—EIGHTH SERIES

JULY—DECEMBER 1974

LONDON:
TAYLOR & FRANCIS LTD, 10-14 MACKLIN STREET WC2B 5NF

" Meditationis est perscrutari occulta ; contemplationis est admirari perspicua . . . . Admiratio generat quæstionem, quæstio investigationem, investigatio inventionem."—*Hugo de S. Victore.*

——" Cur spirent venti, cur terra dehiscat,
Cur mare turgescat, pelago cur tantus amaror,
Cur caput obscura Phœbus furrugine condat,
Quid toties diros cogat flagrare cometas,
Quid pariat nubes, veniant cur fulmina cœlo,
Quo micet igne Iris, superos quis conciat orbes
Tam vario motu."

J. B. Pinelli ad Mazonium.

Copyright 1974 © TAYLOR & FRANCIS LTD

CONTENTS OF VOL. XXX. Nos. (1–6)

(EIGHTH SERIES)

NUMBER 1—JULY

PAGE

Enhanced spin susceptibility in phosphorus-doped silicon
By K.-F. BERGGREN 1

Twist walls in nematic liquid crystals
By ROBERT TURNER 13

Modified perturbation theory and the electrical resistivity of simple liquid metals
By C. BROWN and J. JARZYNSKI 21

Simple self-consistent theory of adhesion at a bimetallic interface
By G. ALLAN, M. LANNOO and L. DOBRZYNSKI 33

Swelling in UO_2 under conditions of gas release
By J. A. TURNBULL and M. O. TUCKER 47

The nature of defects in n^+ gallium arsenide
By P. W. HUTCHINSON and P. S. DOBSON 65

Anisotropy of etching behaviour in b.c.c. tungsten and the problem of edge-screw dislocation distributions
By K. N. TANDON and J. C. BILELLO 75

A dislocation model for yield in polyethylene
By R. J. YOUNG 85

Auger electron emission from Be surfaces
By H. G. MAGUIRE and P. D. AUGUSTUS 95

Measurements of quenched-in resistivity in thin single crystal tungsten wires
By M. KHOSHNEVISAN, E. L. STONE III and J. BASS 105

Stacking fault energy and its influence on high-temperature plastic flow in Zr–Sn alloys
By D. H. SASTRY, M. J. LUTON and J. J. JONAS 115

Behaviour under pressure of viscosity in mercury
By D. BARBERO, R. MALVANO, E. MINETTI-MEZZETTI and M. OMINI .. 129

Electron microscopy of plasmons
By J. R. PARSONS and C. W. HOELKE 135

Low-temperature deformation and dislocation mobility in pure and Mg-doped LiF crystals
By F. GUIU and T. G. LANGDON 145

Field-ion microscopy of tempered martensite
By B. N. RANGANATHAN and HELEN E. GRENGA 161

Craze nucleation in high-impact polystyrene under biaxial states of stress
By R. J. OXBOROUGH and P. B. BOWDEN 171

Structural investigations of amorphous transition element films. I. Scanning electron diffraction study of cobalt
By P. K. LEUNG and J. G. WRIGHT 185

The elongation of liquid droplets migrating through solids
By D. R. H. JONES 195

Correspondence:

The Compton profile of solid o-H_2
By E. DONI and G. PASTORI PARRAVICINI 203

Homogeneous precipitation of niobium nitride in alpha-iron during isothermal treatment
By A. MASCANZONI and G. BUZZICHELLI 207

On strain field interactions with axial domains in V_6C_5
By M. J. MURRAY and R. H. J. HANNINK 213

PAGE

Linearly polarized luminescence from linear defects in natural and synthetic diamond
By I. KIFLAWI and A. R. LANG 219
Reduction in electron irradiation damage to organic compounds by conducting coatings
By S. M. SALIH and V. E. COSSLETT 225

NUMBER 2—AUGUST

Molecular dynamics studies of melting. II. Dislocation density and thermodynamic functions
By W. DAMGAARD KRISTENSEN, E. J. JENSEN and R. M. J. COTTERILL... 229
Molecular dynamics studies of melting. III. Spontaneous dislocation generation and the dynamics of melting
By R. M. J. COTTERILL, W. DAMGAARD KRISTENSEN and E. J. JENSEN... 245
A molecular dynamics approach to grain boundary structure and migration
By R. M. J. COTTERILL, T. LEFFERS and H. LILHOLT 265
A phenomenological heterogeneous nucleation approach to martensite
By J. R. C. GUIMARÃES and D. L. VALERIANO ALVES..... 277
Viscosity of liquid K-Hg alloys
By MASAHIRO KITAJIMA, TOSHIO ITAMI and MITSUO SHIMOJI 285
Flux pinning mechanisms in type II superconductors
By D. DEW-HUGHES 293
The spectral distribution of multiple Compton scattering for X-rays
By BRIAN G. WILLIAMS, PHILIP PATTISON and MALCOLM J. COOPER ... 307
A new line defect, displaced atomic row, in b.c.c. lattices
By S. TAKEUCHI and E. KURAMOTO 319
Density and electrical conductivity of expanded mercury and dilute mercury–indium alloys
By UZI EVEN and JOSHUA JORTNER 325
Diffraction contrast study of the defect structure of polyethylene single crystals
By E. L. THOMAS, S. L. SASS and E. J. KRAMER 335
Low-temperature magnetic susceptibility of amorphous Ag-Mn
By W. C. KOK 351
A direct lattice-resolution study of precipitation (exsolution) in orthopyroxene
By P. E. CHAMPNESS and G. W. LORIMER..... 357
Computer simulation of dislocation emission from a stressed source
By T. YOKOBORI, A. T. YOKOBORI, Jr. and A. KAMEI 367
The nature of martensite: matrix interfaces in β-brass alloys
By JEFF PERKINS 379
Metal-insulator transitions in VO_2, Ti_2O_3 and $Ti_{2-x}V_xO_3$
By N. F. MOTT and L. FRIEDMAN 389
Rare-earth compounds with mixed valencies
By N. F. MOTT..... 403
On the configurational entropy of amorphous Si and Ge
By FRANS SPAEPEN 417
On the ground state properties of the anisotropic triangular antiferromagnet
By P. FAZEKAS and P. W. ANDERSON 423

Correspondence :

Structure of polyethylene
By R. J. WEISS and C. R. DESPER 441
High-resolution topographical imaging by direct transmission electron microscopy
By A. G. CULLIS and D. M. MAHER..... 447

NUMBER 3—SEPTEMBER

PAGE

On the Burgers vectors of grain boundary dislocations
By Y. Ishida and M. McLean 453
Burgers vectors of grain boundary dislocations: A correction
By M. A. Fortes 457
Dislocation Burgers vectors for cubic metal grain boundaries
By D. H. Warrington and H. Grimmer 461
The α–γ transition in cerium is a Mott transition
By Börje Johansson 469
A study of 2 MeV helium-irradiated phosphorus-diffused silicon
By C. R. Allen and R. W. Bicknell 483
Fluxoid pinning in niobium containing small amounts of yttrium or gadolinium
By C. C. Koch and D. M. Kroeger 501
A study of kinking and buckling in zinc single crystals
By E. G. Tapetado and M. H. Loretto 515
A molecular model for yield and flow in polymethylmethacrylate
By A. Thierry, R. J. Oxborough and P. B. Bowden 527
Effect of multiple scattering on experimental Compton profiles: a Monte Carlo calculation
By J. Felsteiner, P. Pattison and M. Cooper 537
Direct resolution of surface atomic steps by transmission electron microscopy
By D. Cherns 549
Elastic moduli of some ferrites at low temperatures
By B. P. N. Reddy and P. J. Reddy 557
Pseudoelasticity in Au–Cu–Zn thermoelastic martensite
By S. Miura, S. Maeda and N. Nakanishi 565
Substructural development during strain cycling of alpha–iron
By O. K. Chopra and C. V. B. Gowda 583
The annealing of dislocations in high-angle grain boundaries
By P. H. Pumphrey and H. Gleiter 593
Charge transfer complexes in intercalated layer compounds
By J. V. Acrivos and J. R. Salem 603
Dislocation χ dans les cholesteriques. II. Modèles des dislocations χ
Par Jacques Rault 621
Low-temperature thermoelectric power of palladium–silver alloys
By A. M. Guénault 641
Mössbauer studies of electronic properties of iron impurities in hexagonal close-packed metals
By Christian Janot and Pierre Delcroix 651
Energies de défaut d'empilement et mécanismes de déformation dans les alliages nickel–chrome
Par Nicole Clement et Pierre Coulomb 663

Correspondence :

Grain boundaries in thin-film bicrystals of surface-reactive metals prepared by vacuum welding
By W. R. Wagner and R. W. Balluffi 673
Stress field of a dislocation segment perpendicular to a free surface
By Y. Maurissen and L. Capella 679
Electrical conductivity and thermoelectric power of liquid In–Te alloys
By K. Popp, H.-U. Tschirner and M. Wobst 685

NUMBER 4—OCTOBER

Structural changes in the lamellar eutectic Al–Al_2Cu during heat treatment
By Abraham D. Banchik and Alberto F. Bonfiglioli 691

PAGE

Description de la préplasticité par la théorie des phénomènes thermiquement activés
Par L. P. KUBIN 705
A model for the fatigue of copper at low plastic strain amplitudes
By A. T. WINTER 719
The electron energy loss spectrum and band structure of diamond
By R. F. EGERTON and M. J. WHELAN 739
Theory of dislocation creep for a material subjected to bombardment by energetic particles. Role of thermal diffusion
By J. H. GITTUS 751
Etude par microscopie électronique des dislocations dans le tellure déformé
Par ALEXANDRE BRONIATOWSKI et GABRIEL FAIVRE 765
Lattice images of $Nb_{22}O_{54}$ and V_6O_{13} in the 1000 kV electron microscope
By SHIGEO HORIUCHI and YOSHIO MATSUI 777
Study of crystallization in lithium silicate glasses using high-voltage electron microscopy
By P. F. JAMES and S. R. KEOWN 789
Studies of voids in neutron-irradiated aluminium single crystals. I. Small-angle X-ray scattering and transmission electron microscopy
By J. E. EPPERSON, R. W. HENDRICKS and K. FARRELL 803
Studies of voids in neutron-irradiated aluminium single crystals. II. Small-angle neutron scattering
By R. W. HENDRICKS, J. SCHELTEN and W. SCHMATZ 819
Localized states in the mobility gap of amorphous quartz and glass
By J. C. ANDERSON 839
Self-diffusion and radiation damage in α-phosphorus single crystals
By E. M. HAMPTON, P. MCKAY and J. N. SHERWOOD 853
Irradiation creep and swelling
By P. T. HEALD and M. V. SPEIGHT 869
Kinetic theory of precipitation processes in solid solutions. I
By M. KOIWA 877
Kinetic theory of precipitation processes in solid solutions. II
By M. KOIWA 895
Kinetic theory of precipitation processes in solid solutions. III
By M. KOIWA 909
Calculation of elastic strain: spherical particle in a cubic material
By ELIZABETH H. YOFFE 923

Correspondence:

Electron microscopy evidence of adatom mobility in amorphous germanium films
By K. L. CHOPRA, A. C. RASTOGI and D. K. PANDYA 935
Dissociation of dislocations in GaP
By P. L. GAI and A. HOWIE 939
Extinction contours and Kikuchi lines in electron microscopy
By J. A. EADES, J. RIQUELME, E. SILVA and A. VAN DUN 945
On the growth of grain boundary cavities in polycrystalline materials
By B. BURTON 953
Excess entropies and volumes of mixing for liquid alloys
By I. H. UMAR, M. WATABE and W. H. YOUNG 957

NUMBER 5—NOVEMBER

Temperature- and field-dependence of hopping conduction in disordered systems
By N. APSLEY and H. P. HUGHES 963
The influence of multiple scattering on the total and differential Compton cross sections in aluminium
By P. PATTISON, S. MANNINEN, J. FELSTEINER and M. COOPER 973

PAGE

Analytic representation of Bloch walls in thin ferromagnetic films
By J. P. JAKUBOVICS 983

Structural investigations of amorphous transition element films. II. Chromium, iron, manganese and nickel
By P. K. LEUNG and J. G. WRIGHT 995

Formation and structure of dislocation networks developed during high-temperature deformation of MgO
By B. REPPICH and W. HÜTHER 1009

The effect of stress changes during creep of single- and polycrystalline MgO
By J. M. BIRCH and B. WILSHIRE 1023

Simulation of dislocation movements by a computer technique
By M. J. TURUNEN 1033

Experimental investigation of dislocation sources in the fluxon lattice of a type-II superconductor
By HELEN VARDULAKI-PETROPOULOU, J. LOWELL and A. C. ROSE-INNES 1043

Correlation factor and isotope effect for dissociative impurity diffusion in f.c.c. metals
By F. A. HUNTLEY 1053

On the evaluation of self-diffusion enhancement of Pb by additions of Cu, Ag and Au
By F. A. HUNTLEY 1075

On the annihilation of oxidation induced stacking faults in silicon
By K. V. RAVI 1081

Pressure-enhanced superconductivity and superlattice structures in transition metal dichalcogenide layer crystals
By P. MOLINIÉ, D. JÉROME and A. J. GRANT 1091

Crystal structure and cohesion in ferromagnetic metals of the iron group
By G. MAZZONE and M. DIANA 1105

Width of charged Néel walls in thin ferromagnetic crystals
By J. P. JAKUBOVICS 1111

Superconducting transition temperatures of chemically vapour-deposited tungsten–rhenium alloys
By D. S. EASTON, C. C. KOCH, D. M. KROEGER and J. W. CABLE 1117

High-temperature strength of dispersion-hardened single crystals. I. Experimental results
By R. S. W. SHEWFELT and L. M. BROWN 1135

Microanalysis of Al–Li alloys containing fine δ' (Al_3Li) precipitates
By D. B. WILLIAMS and J. W. EDINGTON 1147

Correspondence:

Analytical expressions of intrinsic internal friction based on damping data under inhomogeneous strains
By S. ASANO 1155

Electron microscopic observation of ferroelectric and antiphase domains in $Gd_2(MoO_4)_3$
By N. YAMAMOTO, K. YAGI and G. HONJO 1161

On dislocation pole models for twinning
By J. A. VENABLES 1165

Anomalous diffraction doublet from gold films on graphite substrates
By T. P. DARBY and C. M. WAYMAN 1171

The thermopower of lead in high magnetic fields
By A. D. CAPLIN, C. K. CHIANG and P. A. SCHROEDER 1177

The photoluminescence properties of glasses in the As–Se system
By R. A. STREET, T. M. SEARLE and I. G. AUSTIN 1181

Stacking fault probabilities in b.c.c. Zr–Mo alloys
By D. H. SASTRY, M. J. LUTON and J. J. JONAS 1187

PAGE

The phase transition in 2H-TaS_2 at 75 K
By J. P. Tidman, O. Singh, A. E. Curzon and R. F. Frindt 1191
The structure of liquid alkaline earth metals
By Y. Waseda, K. Yokoyama and K. Suzuki 1195

NUMBER 6—DECEMBER

Onset of serrated yielding in Mg–10Ag alloy
By M. C. Chaturvedi and D. J. Lloyd 1199
Mikroskopische Theorie des anisotropen Elektron-Phonon-Systems in Supraleitern II. Art
Von H. Teichler 1209
Structure analysis of polymer single crystals by electron diffraction
By W. Claffey, K. Gardner, J. Blackwell, J. Lando and P. H. Geil 1223
The effects of cold work on the alloy Mg_3Cd
By J. P. Clark and M. B. Bever 1233
The work-hardening of copper–silica. IV. The Bauschinger effect and plastic relaxation
By J. D. Atkinson, L. M. Brown and W. M. Stobbs 1247
Deconvolution in Compton profile measurements
By P. Paatero, S. Manninen and T. Paakkari 1281
Stacking-fault tetrahedra in annealed f.c.c. metals and alloys
By L. M. Clarebrough 1295
Structure and magnetic properties of molecular crystalline ' carbons ' prepared by thermal decomposition of sulphanilic acid in the solid state
By L. J. Dunne and H. Harker 1313
Solid-solution hardening of the ternary system Nb–Hf–W
By Patricia Ruf and Donald Koss 1319
The energy of a set of circular coplanar dislocations
By P. M. Hazzledine 1327
A coplanar Orowan loops model for dispersion hardening
By P. M. Hazzledine and P. B. Hirsch 1331
The Bauschinger effect, work-hardening and recovery in dispersion-hardened copper crystals
By D. Gould, P. B. Hirsch and F. J. Humphreys 1353
Observations of the fine structure of superdislocations in Ni_3Al by field-ion microscopy
By R. J. Taunt and B. Ralph 1379
Radiation-induced diffusion of point-defects during low-temperature electron irradiation
By K. Urban and A. Seeger 1395
Electron microscope study of electrically active impurity precipitate defects in silicon
By A. G. Cullis and L. E. Katz 1419
Subject index 1445
Index of authors (with titles) 1451
List of contents iii